

Distribution and abundance of the main pelagic fish stocks in the Western Gulf of Guinea (Benin, Togo, Ghana and Côte d'Ivoire)

Distribution et abondance des principaux stocks de poissons pélagiques dans l'ouest du golfe de Guinée (Bénin, Togo, Ghana et Côte d'Ivoire)

(English only/En anglais seulement)

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ABSTRACT

Different studies carried out at both national and subregional level has shown that some of the main resources in the Western Gulf of Guinea have become overexploited, and decreases in yield and size of fish have been observed. This situation has been caused by a very high pressure on the stocks through an uncontrolled fishing effort as well as through the widespread use of non-selective gears and overall a lack of policies for the development and management of fisheries.

This situation requires solutions and sustainable management of the resources for future generations. Management must be complemented with appropriate strategic measures to ensure the good health of these resources. It is within this framework, on the request of the Government of Ghana, later supported by the Governments of Benin, Togo and Côte d'Ivoire, that FAO in collaboration with the Institute of Marine Research of Norway (IMR) has carried out several surveys in the economic zone of these countries with the R/V DR. FRIDTJOF NANSEN.

This poster summarizes the main results of six surveys carried out by the R/V DR. FRIDTJOF NANSEN in the waters off Benin, Togo, Ghana and Côte d'Ivoire during the period 1999 to 2006, and also provides some reflections on its possible use in management.

RÉSUMÉ

Les différentes investigations réalisées aussi bien au niveau national qu'au niveau sous-régional, ont montré que quelques ressources dans le golfe de Guinée ouest ont atteint un niveau de surexploitation, avec pour conséquence une baisse des rendements, et une diminution de la taille des poissons pêchés. Cette situation est due à une pression forte sur les stocks, par un effort de pêche incontrôlé, une

utilisation généralisée de pratiques d'engins de pêche non sélectifs et surtout par l'absence d'une vraie politique de développement et aménagement des pêches.

Cette situation nécessite des solutions et une gestion durable en vue d'assurer des ressources pour les générations futures. Cette gestion doit être complémentaire avec des mesures stratégiques appropriées pour la bonne santé de ces ressources. C'est dans ce cadre, sur la demande du Gouvernement du Ghana, supportée par les Gouvernements du Bénin, du Togo et de la Côte d'Ivoire que la FAO en collaboration avec l'Institut norvégien de recherche marine (IMR) entreprend depuis des années des campagnes scientifiques dans les eaux de ces pays avec le N/R DR. FRIDTJOF NANSEN.

Ce poster fait la synthèse des principaux résultats des six campagnes scientifiques réalisées par le N/R DR. FRIDTJOF NANSEN dans les eaux du Bénin, du Togo, du Ghana et de la Côte d'Ivoire pendant la période 1999 à 2006 et apporte quelques réflexions pour l'aménagement.

1. INTRODUCTION

Following requests from the Governments of Ghana, Benin, Togo and Côte d'Ivoire, the Nansen Programme through the FAO Project "International cooperation with the Nansen Programme. Fisheries Management and Marine Environment" has since 1999 conducted regular surveys with the R/V DR. FRIDTJOF NANSEN in the Western Gulf of Guinea. Three surveys were also conducted in the 1980s. Since 2005 the surveys have been part of a larger survey programme in the Gulf of Guinea carried out in collaboration with the Guinea Current Large Marine Ecosystem Project (GCLME).

The main objectives of these surveys were to map the distribution and estimate abundance of the main pelagic and demersal fish stocks in the Gulf of Guinea; map the general hydrographical regime, the sampling of zooplankton and on-the-job training on survey routines. In 2006 two additional objectives were introduced, to collect stomach samples of commercial important fish species to increase knowledge on food and feeding habits; to collect bottom sediment samples and to map the benthic biodiversity in the region.

This paper presents the main results of the six surveys carried out by the R/V DR. FRIDTJOF NANSEN in the waters off Benin, Togo, Ghana and the Côte d'Ivoire during the period from 1999 to 2006 and brings some conclusions that can be very useful for fisheries management.

2. MATERIAL AND METHODS

R/V DR. FRIDTJOF NANSEN surveys in the Western Gulf of Guinea were: 2–25 June 1981 (Cape Verde, Rep. of Guinea, to Cape St. Paul, Ghana); 7–20 August 1981 (Togo to Cameroon); 12–20 October 1989 (Côte d'Ivoire and Ghana); 19 April–6 May 1999; 29 August–17 September 2000; 6 July–9 August 2002; 14 May–8 June 2004; 3 May–29 May 2005; 19 May–7 June 2006.

The shelf was surveyed during daytime (0600 to 1800) by parallel course tracks about 20 nautical miles apart.

Continuous acoustic registrations (echosounder and echo integration for pelagic fish combined with pelagic and bottom trawling) were done throughout the survey. To obtain a denser acoustic coverage, night-time registrations were made in between the daytime-course tracks. Pelagic trawling with a mid-water trawl was carried out during dark hours. Blind trawl hauls were made close to the surface, in the "blind" sector of the echo sounder. A swept-area bottom trawl programme was established for demersal species/groups (Table 1).

A Seabird 911 CTD plus was used to obtain vertical profiles of temperature, salinity and oxygen. Real time plotting and logging was done using the Seabird Seasave software installed on a PC (Table 2).

Wind direction and speed, air temperature, global radiation and sea surface temperature (5 m depth) were logged automatically every nautical mile on an Aanderaa meteorological station, and oxygen 1 metre diameter zooplankton net. The soft-bottom benthic macrofauna sampling was carried out using a Peterson grab with a surface area of 0.20 m.

Table 1: Summary of total survey effort 1999–2006

	CTD	Plankton	Benthos	PT	BT	Distance (NM)
1999	91	8	-	10	80	2 065
2000	95	6	-	40	86	2 230
2002	153	4	-	21	135	2 960
2004	134	9	-	20	122	2 840
2005	155	9	-	27	138	2 865
2006	125	9	9	19	103	2 390

PT - Pelagic Trawl; BT - Bottom Trawl

Table 2: Summary of oceanographic conditions 2005 (0–400 m)

	Temperature (° C)	Salinity (psu)	Oxygen (ml/l)
Benin–Togo	8–28	34.7–35.4	2–4
Ghana	8–29	34.8–35.4	2–4
Côte d'Ivoire	8–29	34.8–35.0	2–4

3. RESULTS

Pelagic fish were present over large parts of the study area, and in particular in the central and western parts. Sardinellas (*Sardinella aurita* and *S. aurita*) and anchovy (*Engraulis encrasicolus*) dominated on the inner shelf, while carangids, scombrids and barracudas are more widely distributed over the entire shelf. *Sardinella aurita* had a more coastal distribution than *S. aurita*. A denser and wider distribution was observed for *Sardinella* spp and anchovy in 2000 compared to the other years, when the densities were weak in parts of the study area.

The 2000 survey was carried out in the upwelling season and, as expected, high abundances were observed for both sardinella and anchovy that year. High abundance of *Sardinella* spp was also observed in 2004 and 2006 (Figures 1 and 2). The total acoustic estimates of anchovies are more variable over the time series, with low values observed for 1999, 2002, 2005 and 2006. In general the larger individuals of these species are found in Ghana and Côte d'Ivoire whereas the smaller individuals are found in Benin and Togo (Figures 3 and 4). The distribution of carangids, scombrids and barracudas show relatively similar distribution pattern for most of the years, with the exception of 2002 and 2004, coinciding with the years when the lowest biomass of this species group was observed (Figures 5 and 6).

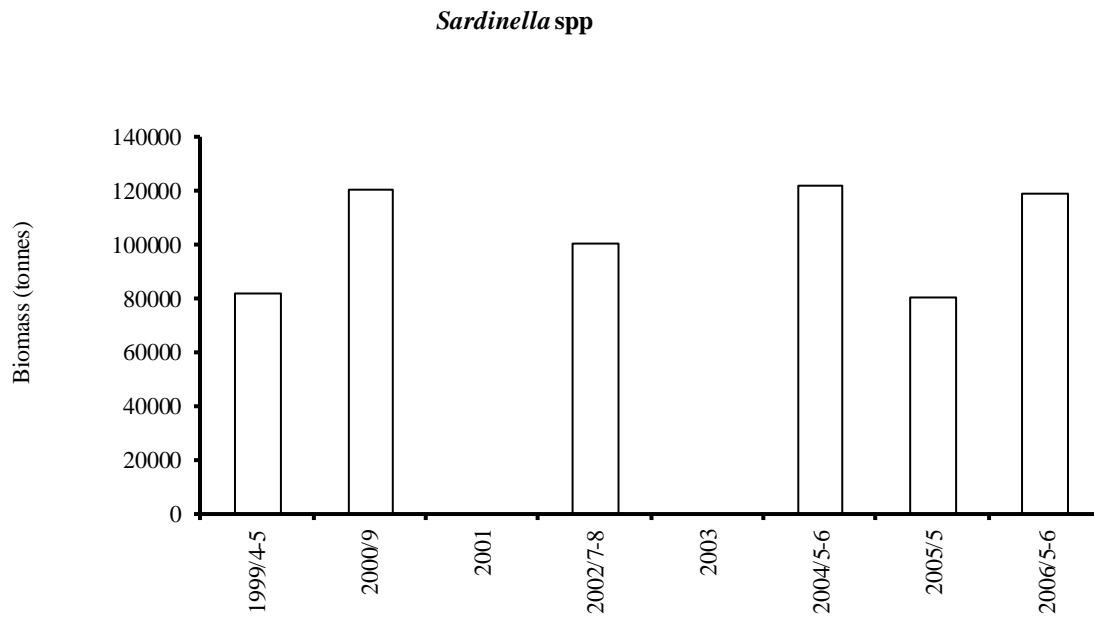
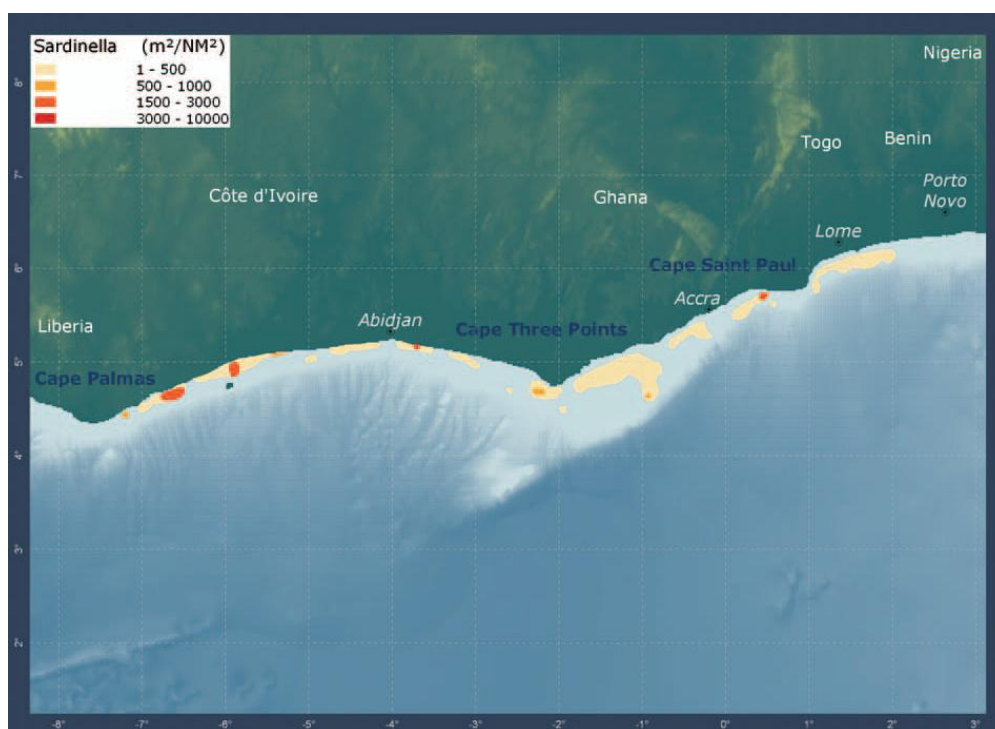


Figure 1: Evolution of biomass of *Sardinella* spp in the Gulf of Guinea

(i)



(ii)

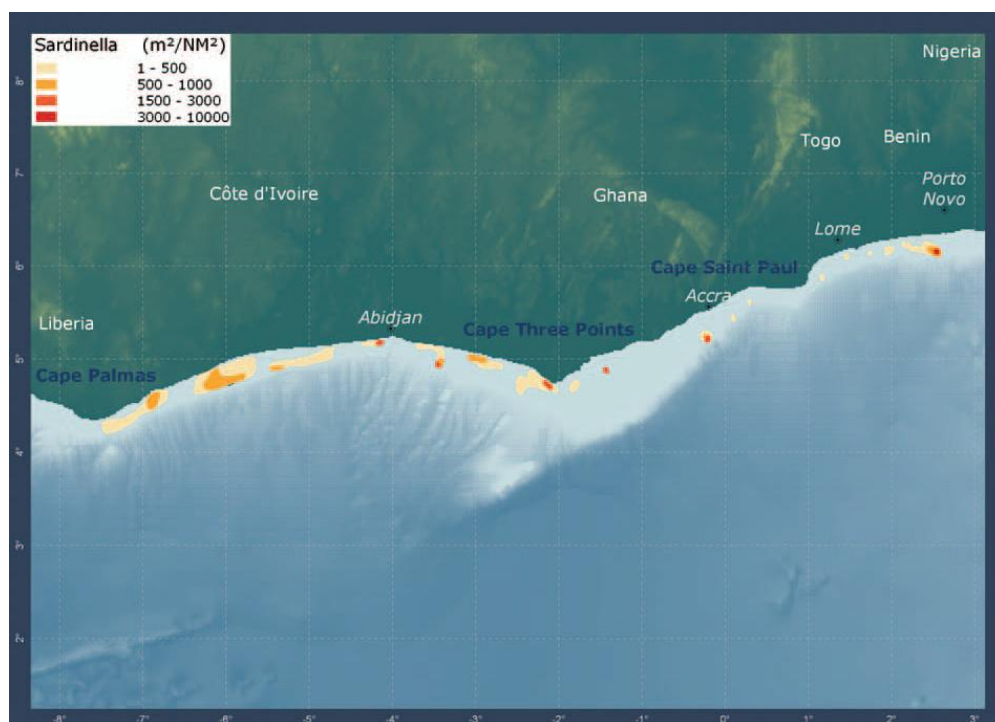


Figure 2: Distribution of *Sardinella* spp in (i) September 2000 and (ii) May/June 2004

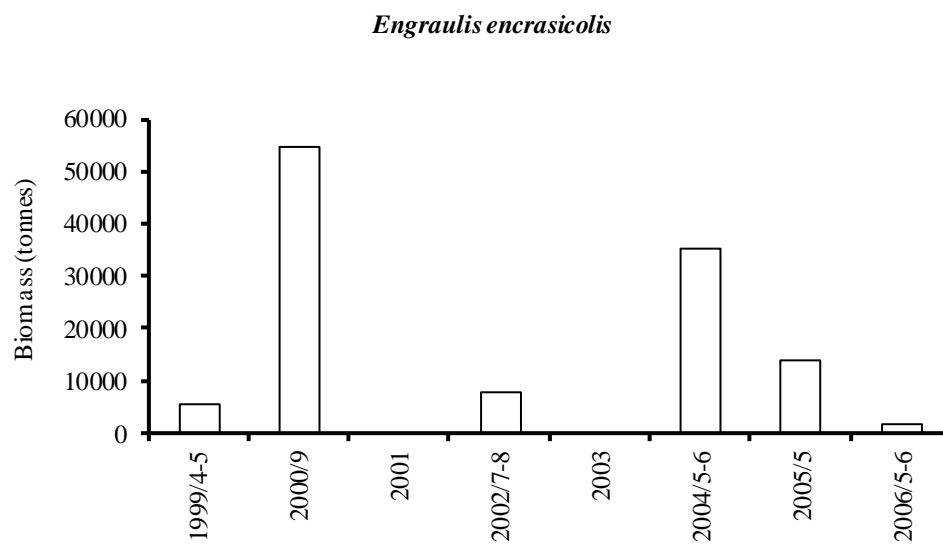
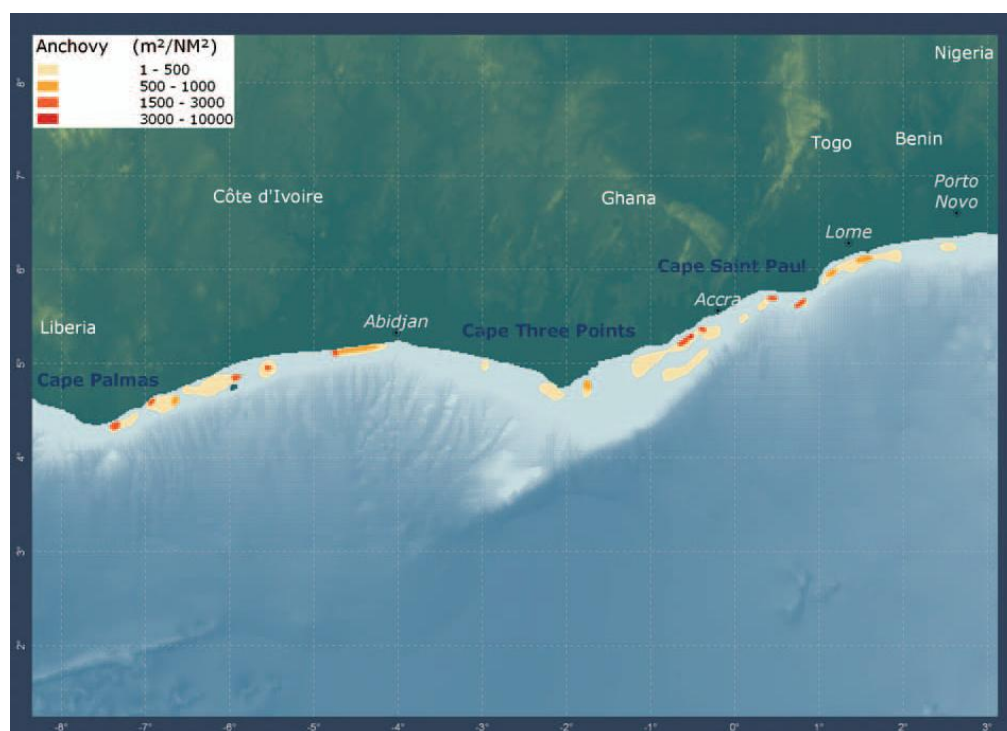


Figure 3: Evolution of biomass of anchovy in the Gulf of Guinea

(i)



(ii)

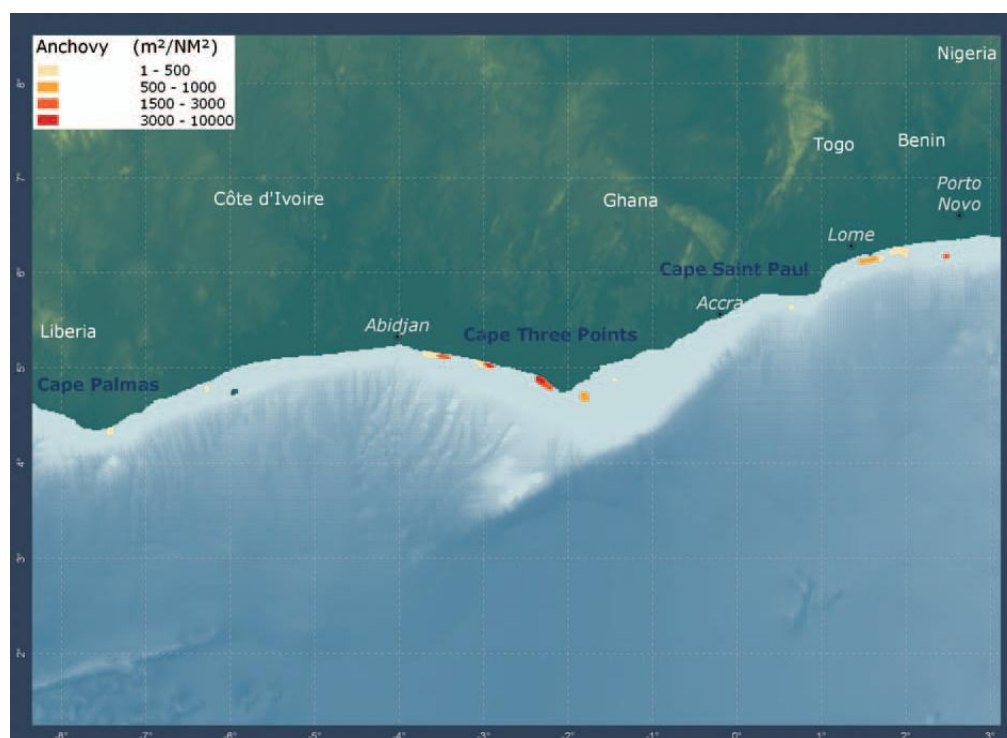


Figure 4: Distribution of anchovy in (i) September 2000 and (ii) May/June 2004

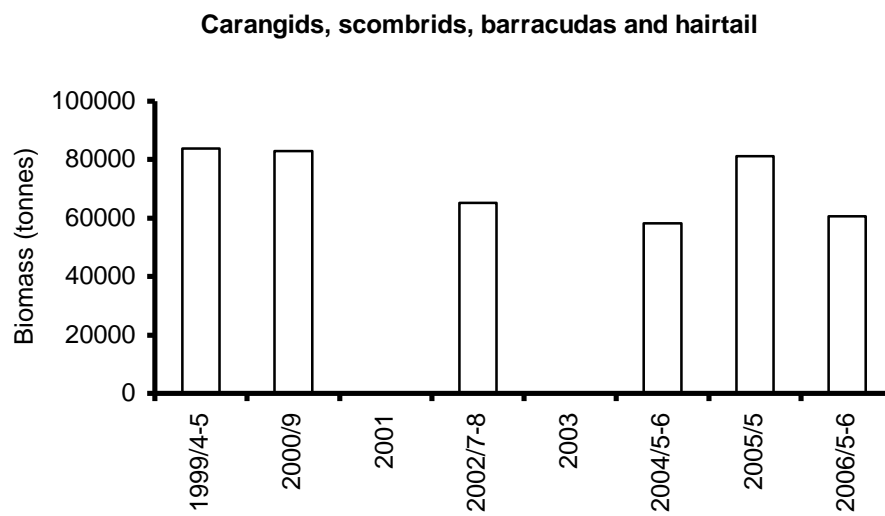
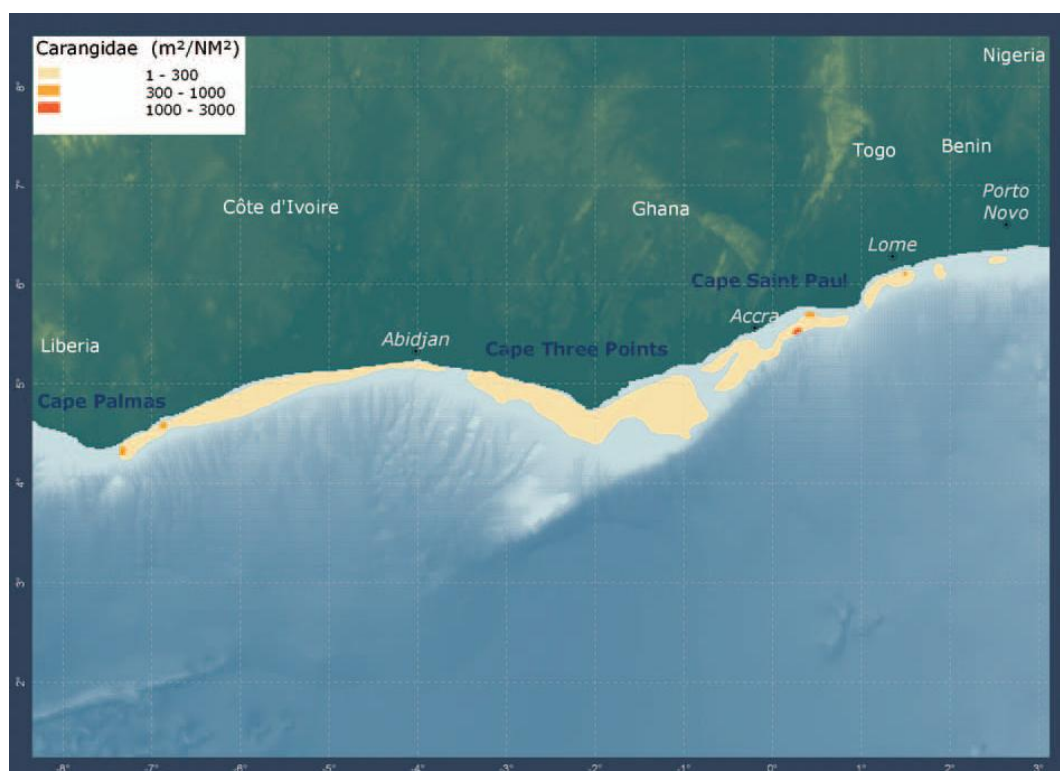


Figure 5: Evolution of biomass of carangids, scombrids, barracudas and hairtail in the Gulf of Guinea

(i)



(ii)



Figure 6: Distribution of carangids, scombrids, barracudas and hartail in (i) September 2000 and (ii) May/June 2004

4. CONCLUSIONS

The results indicate a relatively stable situation, with the absence of marked trends for *Sardinella* spp and the group “carangids, scombrids, barracudas and hairtail”. The variations observed between years could be linked to natural or seasonal variations or to survey uncertainty. For anchovy the variations are more distinct and the upwelling seems to have a larger effect on this species as compared with the other groups. This can be seen from the high abundance observed of this species in 2000 when the survey was carried out in the upwelling season, compared to the lower abundance the other years. Other possible factors that could influence the abundance estimate include variations in year class strength or changes in availability to the survey, due to a very coastal distribution.

5. DISSEMINATION OF RESULTS

The Directors of Fisheries of the coastal countries and other stakeholders are invited to participate in a post-survey meeting at the end of each survey where the cruise leaders present the main results. This provides an excellent opportunity for the managers and scientists to meet and exchange views and experiences.

6. ACKNOWLEDGEMENTS

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